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EXAMINER

PETRANEK, JACOB ANDREW

ART UNIT	PAPER NUMBER
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2183

NOTIFICATION DATE	DELIVERY MODE
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ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

ip.department.us@nxp.com

Office Action Summary	Application No. 10/563,646	Applicant(s) PESSOLANO, FRANCESCO	
	Examiner Jacob Petranek	Art Unit 2183	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 May 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 January 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-20 are pending.
2. The office acknowledges the following papers:
Claims and arguments filed on 5/16/2008.

Withdrawn objections and rejections

3. The claim objections for claims 1-7 are withdrawn.
4. The 112 2nd paragraph rejections for claims 1, 4, and 8 are withdrawn due to amendment.
5. Claims 1 and 8 rejected by Gochman have been withdrawn.

Drawings

6. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the limitation from claim 7 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d).

Claim objections

7. Claims 1 are objected to for the following reasons:

8. Claim 1 recites "identifying occurrence" that should be changed to "identifying an occurrence" on line 3.

New Claim Rejections - 35 USC § 112

9. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

10. Claims 1, 4-6, and 8 recite the limitation "the branch outcome" in lines 5, 5, 3, 2, and 5 of the claims respectively. There is insufficient antecedent basis for this limitation in the claim. The limitation needs to be changed to "the conditional branch outcome" to fix the antecedent basis problem.

11. Claims 2-3, 7, and 9-20 are rejected due to dependency.

New Claim Rejections - 35 USC § 103

12. The following is a quotation of 35 U.S.C. §103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

13. Claims 1-6, 8-9, and 11-15 are rejected under 35 U.S.C. §103(a) as being unpatentable over Wilkerson et al. (U.S. 7,143,272).

14. As per claim 1:

Wilkerson disclosed an apparatus for predicting a conditional branch outcome within a computer system, the apparatus comprising

an activity monitor responsive to identifying an occurrence of a conditional branch (Wilkerson: Figure 9 element 905, column 6 lines 59-66)(It's obvious to one of ordinary skill in the art that branches are detected so that they can be predicted via the lookup table.), the activity monitor providing a measure of system activity since a previous branch for comparison with data relating to previous system activity (Wilkerson: Figures 6 and 9 elements 230, 905 and 915, column 5 lines 19-28 and column 6 lines 16-22 and lines 59-66)(The computation history for a branch instruction is drawn from the source operand. Its value is recursively generated from previous branch instructions. Official notice is given that lookup tables can be arranged to have tags for insuring that the index does retrieve the correct data. Thus, it's obvious to one of ordinary skill in the art that element 230 contains a tag that is used to compare with the activity since a previous branch.), the branch outcome being predicted based on such comparison (Wilkerson: Figure 9 element 925, column 6 lines 16-22)(The branch prediction is retrieved from the lookup table upon a hit in the lookup table.).

15. As per claim 2:

Wilkerson disclosed the apparatus according to claim 1, wherein the data relating to system activity comprises average system activity (Wilkerson: Figure 4 element 225, column 5 lines 19-28)(The computation history is a running average of previous computation histories.).

16. As per claim 3:

Wilkerson disclosed the apparatus according to claim 1, wherein an activity history table is provided that stores and associates previous system activity with

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corresponding outcomes of previous branches (Wilkerson: Figure 6 element 230, column 6 lines 16-22)(The lookup table stores branch predictions based on previous predictions.).

17. As per claim 4:

Wilkerson disclosed the apparatus according to claim 3, wherein data relating the system activity between the conditional branch and the previous branches is retrieved for comparison with the data contained in the activity history table (Wilkerson: Figures 6 and 9 elements 230 and 915, column 5 lines 19-28 and column 6 lines 16-22 and lines 59-66)(The lookup table is accessed for comparison purposes to find a match between the index and a stored prediction.), the branch outcome being predicted based on selecting the previous branch outcome associated with activity history data which most closely resembles the retrieved system activity data (Wilkerson: Figure 9 element 925, column 6 lines 16-22)(The branch prediction is retrieved from the lookup table upon a hit in the lookup table. The hit indicated previous activity that most closely resembles current activity.).

18. As per claim 5:

Wilkerson disclosed the apparatus according to claim 4, wherein the activity history table is updated based on activity data associated with the branch outcome (Wilkerson: Figure 9 element 930, column 7 lines 4-6)(The lookup table is updated based on the branch outcome.).

19. As per claim 6:

Wilkerson disclosed the apparatus according to claim 1, wherein the branch outcome is predicted using the outcome history of the conditional branch (Wilkerson: Figure 9 element 925, column 6 lines 16-22)(The branch prediction is retrieved from the lookup table upon a hit in the lookup table and is used to predict the outcome of the current branch instruction.).

20. As per claim 8:

The additional limitation(s) of claim 8 basically recite the additional limitation(s) of claim 1. Therefore, claim 8 is rejected for the same reason(s) as claim 1.

21. As per claim 9:

The additional limitation(s) of claim 9 basically recite the additional limitation(s) of claim 2. Therefore, claim 9 is rejected for the same reason(s) as claim 2.

22. As per claim 11:

The additional limitation(s) of claim 11 basically recite the additional limitation(s) of claim 3. Therefore, claim 11 is rejected for the same reason(s) as claim 3.

23. As per claim 12:

The additional limitation(s) of claim 12 basically recite the additional limitation(s) of claim 4. Therefore, claim 12 is rejected for the same reason(s) as claim 4.

24. As per claim 13:

The additional limitation(s) of claim 13 basically recite the additional limitation(s) of claim 5. Therefore, claim 13 is rejected for the same reason(s) as claim 5.

25. As per claim 14:

The additional limitation(s) of claim 14 basically recite the additional limitation(s) of claim 6. Therefore, claim 14 is rejected for the same reason(s) as claim 6.

26. As per claim 15:

The additional limitation(s) of claim 15 basically recite the additional limitation(s) of claim 7. Therefore, claim 15 is rejected for the same reason(s) as claim 7.

27. Claims 7 and 15 are rejected under 35 U.S.C. §103(a) as being unpatentable over Wilkerson et al. (U.S. 7,143,272), in view of Chang et al. ("Improving branch prediction accuracy by reducing pattern history table interference").

28. As per claim 7:

Wilkerson disclosed the apparatus according to claim 6.

Wilkerson failed to teach wherein data relating to the activity of the system is only used for branch outcome prediction if the confidence of accuracy of branch outcome prediction using branch history is relatively low.

However, Chang disclosed wherein data relating to the activity of the system is only used for branch outcome prediction if the confidence of accuracy of branch outcome prediction using branch history is relatively low (Chang: Figure 5, section 4.1)(The combination results in the prediction system of Wilkerson being used by default and the BTB high confidence predictor of Chang being used to predict high-confidence branches.).

The advantage of using the two structure predictor of Chang is that it allows for reducing interference from branch history tables, which can also improve branch

prediction performance (Chang: Section 4.1 paragraph 1). One of ordinary skill in the art would have been motivated by this advantage to implement the two-structure predictor of Chang into Wilkerson. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to implement the two-structure predictor of Chang into the processor of Wilkerson for the advantage of reducing interference in the lookup table and increasing branch prediction performance.

29. As per claim 15:

The additional limitation(s) of claim 15 basically recite the additional limitation(s) of claim 7. Therefore, claim 15 is rejected for the same reason(s) as claim 7.

30. Claims 10 and 16 are rejected under 35 U.S.C. §103(a) as being unpatentable over Wilkerson et al. (U.S. 7,143,272), in view of LeFevre et al. (U.S. 6,854,066).

31. As per claim 10:

The additional limitation(s) of claim 10 basically recite the additional limitation(s) of claim 16. Therefore, claim 10 is rejected for the same reason(s) as claim 16.

32. As per claim 16:

Wilkerson disclosed an apparatus according to claim 1.

Wilkerson failed to teach wherein the activity monitor monitors supply current.

However, LeFevre disclosed wherein the activity monitor monitors supply current (LeFevre: Column 2 lines 51-67 continued to column 3 lines 1-15)(LeFevre disclosed a power management system to monitor current usage. It's obvious to one of ordinary skill in the art that the power management system and the branch predictor of Wilkerson

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can be performed in the same unit. In addition, according to “In re Japikse” (181 F.2d 1019, 86 USPQ 70 (CCPA 1950)), shifting the location of parts doesn’t give patentability over prior art.).

The LeFevre power management system has the advantage of monitoring power consumption without being reconfigured for adding and removing system components (LeFevre: Column 2 line 67 continued to column 3 lines 1-6). One of ordinary skill in the art would have been motivated by this advantage to implement the power management system into the processor of Wilkerson. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to implement the power management system of LeFevre into Wilkerson for the advantage of monitoring power consumption without reconfiguration for portable systems.

33. Claims 17-20 are rejected under 35 U.S.C. §103(a) as being unpatentable over Wilkerson et al. (U.S. 7,143,272), in view of Kime et al. (“Logic and computer design fundamentals”).

34. As per claim 17:

Wilkerson disclosed an apparatus according to claim 1.

Wilkerson failed to teach wherein the activity monitor includes a series of logic elements including a plurality of sequential logic elements clocked by a clock signal and plurality of combinatorial logic elements connecting the sequential logic elements such that, for a given clock signal cycle, counting state changes within the logic elements provides the measure of system activity.

However, Kime disclosed wherein the activity monitor includes a series of logic elements including a plurality of sequential logic elements clocked by a clock signal (Kime: Section 5-3)(Wilkerson: Figure 4 element 430)(The shifting logic is shown in more detail by Kime by having sequential logic as the building blocks of a shifter.) and plurality of combinatorial logic elements connecting the sequential logic elements (Kime: Figure 3-3, sections 3-1 and 3-2)(Wilkerson: Figure 4 element 425)(The XOR logic is shown in more detail by Kime by having sequential logic as the building block of the XOR element.) such that, for a given clock signal cycle, counting state changes within the logic elements provides the measure of system activity (Wilkerson: Figure 4 element 410)(A state change occurs for the computational history each time an instruction is executed.).

Wilkerson disclosed higher-level logic elements, but failed to detail the individual lower-level combinational and sequential logic circuits that make up the higher-level circuits. One of ordinary skill in the art would have been motivated by this lack of information to find Kime that discusses the lower-level details of how combinational and sequential circuits are build from the ground up. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to implement the lower-level circuits of Kime into the higher-level circuits of Wilkerson to show in detail how the circuits of Wilkerson are build and designed.

35. As per claim 18:

Wilkerson and Kime disclosed an apparatus according to claim 17, wherein the sequential logic elements include flip-flops (Kime: Section 5-3).

36. As per claim 19:

The additional limitation(s) of claim 19 basically recite the additional limitation(s) of claim 18. Therefore, claim 19 is rejected for the same reason(s) as claim 18.

37. As per claim 20:

Wilkerson and Kime disclosed an apparatus according to claim 17, wherein the combinatorial logic elements include processing logic blocks and data path logic blocks (Kime: Figure 3-3, sections 3-1 and 3-2).

Response to Arguments

38. The arguments presented by Applicant in the response, received on 5/16/2008 are not considered persuasive.

39. Applicant argues "With respect to the objection to the drawings, 37 C.F.R. § 1.81(a) states that a patent application should furnish drawings as necessary for the understanding of the subject matter sought to be patented. 37 C.F.R. § 1.83(a) further explains that the supplied drawings should show all the features specified in the claims. In this case, it has not been argued that Applicant has neglected to provide drawings, or details of the drawings, that are necessary for the understanding of the invention, but rather that a dependent feature recited in claim 7 is not shown. Applicant submits that step 108 shown in Fig. 1, which illustrates the step of determining branch outcome adequately shows and encompasses the subject matter recited in claim 7. For example, step 108 includes predicting branch outcome using branch history and/or system activity, and includes using them conditionally. Applicant submits that such illustration is

sufficient for understanding the claimed invention. See M.P.E.P. § 608.02(e). For these reasons, Applicant requests reconsideration and withdrawal of the objection to the drawings.”

This argument is not found to be persuasive for the following reason. As the applicant stated, “37 C.F.R. § 1.83(a) further explains that the supplied drawings should show all the features specified in the claims.” The applicant cited figure 1 element 108 as supposedly supporting the claimed limitation of claim 7. However, element 108 only details predicting a branch and doesn't detail the specific limitations of claim 7.

As far as the drawings being previously deemed acceptable, they were previously deemed acceptable by another examiner and not the current examiner working on the case. In addition, claim and drawing objections can be made at any point during examination.

40. Applicant argues “Applicant respectfully traverses the § 103(a) rejection of claims 1 and 8 over the Goodman reference, which does not appear to disclose the recited features related to obtaining a measure of system activity since a previous branch, and using the system activity measure to predict the outcome of a conditional branch.”

The examiner has withdrawn the rejections based on Gochman reference. (The examiner assumes that the applicant in making arguments against the “Goodman” reference intended to mean the Gochman reference.)

41. Applicant argues “Applicant respectfully traverses the § 103(a) rejection of claims 1-6 and 8 over the Wilkerson reference, which does not appear to disclose the recited

features related to obtaining a measure of system activity since a previous branch, and using the system activity measure to predict the outcome of a conditional branch.”

This argument is not found to be persuasive for the following reason. Wilkerson disclosed obtaining computation history by recursively obtaining information about each instruction since a previous branch and using the computation history since a previous branch to index into a branch history table to fetch a branch prediction. The computation history is a measure of activity since a previous branch and can be correctly interpreted as system activity. This activity is then used to make a branch prediction as shown by element 925 in figure 9.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

The following is text cited from 37 CFR 1.111(c): In amending in reply to a rejection of claims in an application or patent under reexamination, the applicant or patent owner must clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. The applicant or patent owner must also show how the amendments avoid such references or objections.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jacob Petranek whose telephone number is 571-272-5988. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan can be reached on (571) 272-4162. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Eddie P Chan/
Supervisory Patent Examiner, Art Unit 2183

Jacob Petranek
Examiner, Art Unit 2183